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NOTICES FROM THE LICK OBSERVATORY.*

PREPARED BY MEMBERS OF THE STAFF.

NEW SPECTROSCOPIC BINARY STARS.

During the absence of Dr. CAMPBELL from the Observatory a few results of interest have been obtained in the work with the Mills spectrograph. Three new spectroscopic binaries have been discovered,—viz., ν *Andromedæ*, π^4 *Orionis*, and σ *Geminorum*.

The first of these, ν *Andromedæ*, has very few lines in that part of the spectrum which we use, and the hydrogen line whose wave-length is 4340.634 is quite diffuse; but there are a few lines due to helium and magnesium which allow fairly accurate measurements. The radial velocity was —17 kilometers per second on October 8, 1902, —76 kilometers on November 5th, and +49 kilometers on January 14, 1903, giving a total range of 125 kilometers.

The star π^4 *Orionis* has a spectrum very similar to that of ν *Andromedæ*, but the range of velocity which we have obtained is not so great, though it is too large to allow any doubt of the star being a binary. The velocity was +43 kilometers on October 6, 1902, \pm 0 on January 4, 1903, and +6 on January 12th.

The spectrum of σ *Geminorum* shows a great number of metallic lines, though they are in most cases rather ill-defined, so that measurements of its velocity are not so accurate as is the case with most stars whose spectra show numerous lines. The rather rough preliminary measurements that have been made show such a range of velocity, however, that the star is certainly a binary. On March 16, 1902, its velocity was approximately +74 kilometers, against +12 kilometers on January 12th and +9 on January 13, 1903.

* Lick Astronomical Department of the University of California.

Another star, ϕ_2 *Orionis*, is interesting on account of its great radial velocity. Approximate measurements give + 96 kilometers on October 28, 1902, + 103 on November 24th, and + 98 on December 30th. It is not likely that the range of seven kilometers in these measurements indicates a real variability in the velocity of the star, for the plate of November 24th was taken under poor conditions and was very much under-exposed.

Approximate measurements of the plates of the spectrum of τ *Ursæ Majoris*, taken on January 22, 1900, and April 15, 1902, respectively, showed a range of five kilometers. As this was sufficient to cause suspicion of variability, Mr. STEBBINS measured both plates very carefully, and obtained the velocities — 3.8 kilometers for the first date and — 10.2 for the second, showing that the star is almost certainly a binary. A rough measurement of a later plate gives a velocity of — 4 kilometers (on December 29, 1902).

Most of the measurements of the other plates were made by Dr. H. D. CURTIS, and many of the plates were exposed by him.

H. M. REESE.

THE DIAMETER OF *TITAN*.

The statement is sometimes made in books on astronomy that the diameter of *Titan* is probably 3,000 to 4,000 miles. These values are undoubtedly too large. When the micrometer-wires of the 36-inch refractor are separated to an amount corresponding to a diameter of 4,000 miles and the image of *Titan* is placed between them, this image, when the atmospheric conditions are sufficiently good to stand very high powers, will easily be seen to be entirely inside the inner edges of both wires. When the wires are separated to correspond to a diameter of three thousand miles the image is very nearly tangent to the inner edges of both wires, from which it may be inferred that the diameter is certainly less than 3,000 miles.

During the past opposition, while measuring the relative positions of the satellites of *Saturn*, I have on several nights satisfied myself respecting the correctness of the above statements. On two nights when the seeing was particularly good I have also measured the apparent diameter of *Titan*, with the following results:—